Dose Range Checking in a Computer Order Entry System

David Rich, M.D., James Menke, M.D., M.S., and David Fisher, M.D.. Pediatrics, Columbus Children's Hospital, Columbus, OH, Ohio State University, Columbus, OH

ABSTRACT: We recently implemented a computer order entry (COE) system which uses decision support for dose range checking. In addition to providing decision support at the point of order entry via "alerts", the system tracks data regarding the occurrence of alerts related to dosing errors. We reviewed the dosing alerts for a "high risk" medications in a COE system. Telephone alerts were more likely to trigger alerts. There were more low dose than high dose alerts. Some alerts could be avoided by adjusting the threshold.

OBJECTIVE: To review dosing alerts for a group of "high risk" medications in a COE system.

DESIGN/METHODS: Prior to the implementation of the COE system, 37 high risk medication items were identified by the hospital pharmacy and assigned high and low dose ranges based on weight and/or age. Each time these items were ordered in error (i.e. wrong dose or wrong frequency), the system alerted the person entering the order, noting the appropriate dose and prompting review of the order. Each alert and all medication orders were stored in a clinical data repository.

All alerts for for incorrect dosing for the first 7 months of system use were reviewed using a report generator (Crystal Reports, Seagate). Each alert had information identifying the patient, ordering clinician, ordered dose, and recommended dose. A second report tabulated the total frequency of orders for each of the 37 medication items, sorted by physician entered orders and telephone orders entered by ancillary staff.

RESULTS: 3438 orders were written for the 37 items triggerring 426 alerts (12%). 2792 orders (81%) were entered directly by physicians, while 646 (19%) were taken as telephone orders by RNs and/or pharmacists. Of the physician orders, 287 (10%) triggerred alerts. Of telephone orders, 124 (19%) triggerred alerts. Only 12 orders (0.35% of all orders for these medications) triggered alerts for 2 fold or greater dosing errors. Of these, 5 were entered by physicians, and 7 were telephone orders. Low dose alerts were more common than high dose alerts for both physician entered orders (6% vs. 4%) and telephone orders (13% vs. 6%). 106 (25%) of all alerts were triggered by small differences (<10%) in the prescribed dose and the recommended dose.

CONCLUSIONS: An added benefit of COE systems is the ability to more easily review medication orders and assess the ultility of decision support tools. For this group of medications, the error rate was 12%. Of all orders, telephone orders were more likely to trigger a dosing alert. Low doses were more common than high doses. Some of the alerts could be avoided by adjusting the thresholds for the alerts.